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ABSTRACT

W. V. O. Quine's analysis of the analytic and synthetic distinction is discussed. The implications of his argument for science are stated as: (1) the importance of formal logic and proofs in science is reduced; (2) the importance of rhetoric in science is recognized; (3) the meaning of words cannot be fixed, and nonexistent identities between natural language terms cannot provide a foundation for science--there is no core structure or permanent foundation for scientific knowledge; and (4) pragmatism is central to scientific research and theory. Disciplinary knowledge is transitory and in the long run it turns out to be fictitious. Social scientists deal in fictions because there is no foundational knowledge. This gives them the luxury of using a wider range of criteria in assessing the stories they tell students, thus the continuity between the social sciences and literature. The stories still can be ranked as being more or less truthful because the social sciences have developed methodological guidelines for distinguishing better from worse stories. These guidelines indicate how to tell social scientific stories given what is currently thought to be the best ways to tell such stories. The stories can also be assessed in terms of aesthetics and ethics. By giving up the illusion of foundational knowledge, there is an opening for a richer, more complex, and possibly more humane approach to community building in education. A 9-item bibliography is included. (JB)

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THE SOCIAL SCIENCES AS CONTINUOUS WITH LITERATURE

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If we get rid of traditional notions of "objectivity" and
"scientific method" we shall be able to see the social
sciences as continuous with literature--as interpreting
other people to us, and thus enlarging and deepening our
sense of community. (Richard Rorty, 1983, p. 203)

Many of the social science disciplines, at different times in this
century, have appropriated the label "scientific:" psychology and
economics before World War II, political science, sociology, and
geography after World War II, anthropologists, perhaps exhibiting the
greatest wisdom of all, have not aspired to be scientific in any serious
way. What counts as scientific has varied from time to time. Common

threads among these different accounts, however, include that to be scientific means controlled and systematic inquiry with a goal of discovering and stating laws of nature. This seems simple and straightforward enough but philosophers of science whose job it is to spell out and clarify what this means do not seem close to doing so (Suppe, 1977). Discovering laws of nature, for example, is no longer an unqualified goal of science nor is it conceded that laws of nature are true (Lambert and Brittan, 1970, pp. 88-91).

It should be expected that philosophers of science, at the least, can distinguish between what is science and what is not science. This used to mean that science produces valid and reliable knowledge in contrast to metaphysical beliefs of one sort or another such as, religious beliefs, political ideologies, ethical claims, and artistic and literary aesthetics and values. Karl Popper (1965) identified the demarcation between science and non-science with the falsifiability of a hypothesis: If evidence against a hypothesis could be collected it was, in principle, scientific; if evidence against a hypothesis could not be collected it was non-scientific. More generally the demarcation between science and non-science, in this century, has been thought to include the following distinctions: analytic/synthetic, fact/value, theory/practice, cognitive/affective, and description/prescription. The last three are variations of the distinction between facts, "what statements (when true) state" (Strawson, 1964, p. 38), and values, "preferences or judgments of worth." The distinction between facts and values has been questioned by many writers and this long quotation from Eagleton shows how vulnerable and fragile this distinction is.

According to this view [that there is a distinction between facts and values], the world is divided between solid facts "out there" like Grand Central station, and arbitrary value judgments "in here" such as liking bananas or feeling that the tone of a Yeats poem veers from defensive hectoring to grimly resilient resignation. Facts are public and unimpeachable, values are private and gratuitous. There is an obvious difference between recounting a fact, such as "This cathedral was built in 1612," and registering a value-judgement, such as "This cathedral is a magnificent specimen of baroque architecture." But...[an overseas visitor might ask] why do you keep telling me the dates of the foundation of all these buildings? Why this obsession with origins? In the society I live in...we keep no record at all of such events: we classify our buildings instead according to whether they face north-west or south-east. What this might do would be to demonstrate part of the unconscious system of value-judgments which underlies my own descriptive statements...no factual judgments I make can escape them. Statements of fact are after all statements, which presumes a number of questionable judgments: that those statements are worth making, perhaps more worth making than certain others, that I am the sort of person entitled to make them and perhaps able to guarantee their truth, that you are the kind of person worth making them to, that something useful

is accomplished by making them and so on. (1983, pp. 12-13)

Exposing the value orientations upon which factual statements rest requires that scientific knowledge no longer be thought of as value free knowledge, it is knowledge contaminated by values from the outset. Value laden or not, however, such knowledge claims may be true and may not be particularly literary.

The analytic/synthetic distinction, the first distinction mentioned above, is my concern here. The distinction concerns different types of statements: analytic statements whose truth or falsity are determined by "rules" or "convention" and are independent of matters of fact, such as mathematical equations, logical proofs, or computer programs; and synthetic statements whose truth or falsity is grounded in fact, such as the earth revolves around the sun, light travels faster than sound. This distinction, it was claimed, is important for all types of scientific activity because: (1) synthetic statements are hypotheses to be tested, generalizations from experiments, and so on; (2) analytic statements are based on principles of formal reasoning and provide rules for making sure that theories are internally consistent and not contradictory, that valid derivations have been generated, and so on. A valid deductive argument (composed of analytic statements) was, for much of this century, the idealized model for scientific theories: If the premises of the theory are true, then the hypotheses are likewise true (from this the hypothetico-deductive model of explanation got its name). The derived hypotheses are tested and, depending upon the outcome the theoretical premises are modified.

The truth preserving property of a valid logical argument is essential for what once was the standard or received view of scientific knowledge. Formal logic played a central and necessary role in science, it was the basis for judging the internal consistency of an explanation or theory and guaranteed that whatever was asserted in the derivations (testable hypotheses) was contained in the premises (theoretical generalizations). Stringing synthetic statements together does not guarantee the truth or validity of anything. Thus, the distinction between analytic and synthetic statements was a key, a linchpin, a foundation for scientific knowledge. Each kind of statement performed separate and distinct scientific tasks that permitted a clear characterization of scientific terms and knowledge. In this view of things logic was important in science whereas rhetoric, "the art of speaking or writing effectively" and "skill in the effective use of speech" (Webster's Ninth New Collegiate Dictionary), was important only insofar that clarity and simplicity were valued in scientific writing.

As desirable, intuitively appealing, and correct as the analytic/synthetic distinction once appeared, there is substantial reason to doubt its existence. It seems, moreover, that if it exists it is only under special circumstances that are limited in application and trivial to science broadly conceived. As a result of this argument (see next section) it was understood that logic was less central and important in science and rhetoric, more important than had heretofore been thought, thus the reference in the title that the social sciences are continuous with literature. Scientists still did the same kind of research only what they did and said had to be interpreted differently.

Implications of this argument, that analytic statements cannot be shown to be categorically distinct from synthetic statements, are still being understood and absorbed by social scientists. It may initially seem arcane and abstruse but it goes to the heart of the meaning of social science and social studies education. Here is the argument.

"Two Dogmas of Empiricism"

W.V.O. Quine first presented "Two Dogmas of Empiricism" before the Eastern Division of the American Philosophical Association in 1950, it appeared as an article in the Philosophical Review in 1951, and later as a chapter in From a Logical Point of View in 1983 (the following page numbers are to the book). It has been widely reprinted. Quine begins by asserting that modern empiricism has been founded on two dogmas: (1) that there is a fundamental cleavage between truths that are analytic and truths that are synthetic, and (2) that theoretical terms are meaningful because they are logically defined in terms of observational terms, this is known as reductionism (p. 20). He claimed that both are ill founded.

His analysis of the analytic and synthetic distinction began by trying to clarify what it is for a statement to be analytic. If it is possible to clarify the nature of analyticity, then it should be possible to show that synthetic statements, whose truth or falsity depend on facts, are something quite different. Quine begins, then, by posing the question: What is analyticity? "A statement is analytic when it is true by virtue of meanings and independently of fact" (p. 21). This, of course, presupposes that the concept of meaning has been settled. Meanings do not attach to things, such as to airplanes,

automobiles, or freeways, meanings attach to words and statements. Quine wrote, "Meaning is what essence [things have essences] becomes when it is divorced from the object of reference and wedded to the word" (p. 22). The next step is that if meanings are properties of words and statements, then meanings are tied up with synonymy (what is a synonym) and analyticity (how do we know a statement is true independent of facts).

His analysis began with two statements, the first was,

(1) No unmarried man is married.

This is an analytic statement because not only is it true as it stands but it is true under any reinterpretations of "man" and "married." "In general a logical truth is a statement which is true and remains true under all reinterpretations of its components other than the logical particles" (pp. 22-3).

The second statement was,

(2) No bachelor is married.

This statement, by the way, is used from time to time as an illustration of an analytic statement in introductory logic textbooks. If (2) is an analytic statement it can be turned into a logical truth by substituting synonyms for synonyms. "Thus (2) can be turned into (1) by putting 'unmarried man' for its synonym 'bachelor'" (p. 23). (A note here. If a clear characterization of analyticity or synonymy can be given, then science and literature (from the title of this paper) can be kept separate. If, on the other hand, this cannot be done, then social science and literature will not be distinct and will be continuous from one to the other.)

Quine attempted to solve this problem in a variety of ways, only five of which will be reviewed. One way to solve the problem, that many might suggest, is by definition--appeal to the nearest dictionary. But lexicographers are empirical scientists and only report usages, not meanings. To appeal to a dictionary would be to determine the analytic meaning of bachelor by looking for empirical evidence about how the word "bachelor" is used, but the task Quine set for himself was to distinguish analytic from synthetic meanings not show that they are dependent.

A second approach is to determine the meaning of bachelor and its synonyms by looking for a word that is interchangeable with it, "in all contexts without change in truth value" (p. 27). But he notes that as soon as we consider "bachelor of arts" or "bachelor buttons" unmarried man does not fit. If one were even writing a computer program they might not match because of differences in the number of letters or because of the difference between two words and one word.

A third approach is to investigate what he calls cognitive synonymy, meanings need not be interchangeable and identical in all contexts, rather they need only have the same meaning. Unfortunately, in order for us to know what this means we will have to wait until he or someone else finishes this investigation.

A fourth approach is to appeal to semantical rules that assign meanings to words in a language. Semantic rules exist for artificial languages--that is, for a computer language there exists a set of rules that specifies what different commands and operations mean, likewise for arguments in formal logic and mathematics. Semantical rules do not

exist for natural languages--that is, such rule do not exist for English, French, Russian, Chinese, and so on.

A fifth approach is a variation on the fourth, it identified analytic statements in languages that are created for special purposes and novel situations, such as formal logic and computer languages, have codebooks (meta-languages, as it were) that specify identities, that is, when do two words or statements have the same meaning. Synonymy and analyticity are not a problem for artificial languages. As soon as one wants to translate from an artificial to a natural language, however, the problem of analyticity returns.

The argument that Quine made did not prove that analytic and synthetic statements are not distinct. He simply demonstrated that many approaches to showing that they are distinct are not successful, but, no one has succeeded in making the distinction since 1950 although many philosophers have objected on the grounds that since we use analytic and synthetic statements differently they obviously must be different (a very unphilosophical objection).

Quine's analysis turns on the question of meaning and the closely related matter of translation because only if one can give an account of analyticity and synonymy can one give an account of translation.

Translation can be thought of in terms of natural languages, say from English statements to French statements or it can be thought of from theoretical terms to observables, say from political power, educational achievement, intelligence quotient, group morale, and so on to how these abstract terms are measured. This is the same problem, obviously, as analyticity and synonymy: How does one translate across levels of

theoretical abstraction and research operations so that original intended meanings are preserved? A parallel question for social studies educators is: How does one translate from social scientific knowledge to social studies education? If the problem of synonymy cannot be solved it is not possible to be sure that original, intended, theoretical or observational meanings are preserved as terms are substituted for one another. By 1971 Carl Hempel admitted that as a

result of Quine's argument he, Hempel, was unable to give an account of the status of theoretical terms in science.¹

Quine's deconstruction of the analytic/synthetic distinction is a major contribution to modern logic. Furthermore, it has produced major rethinking of the nature of science and scientific knowledge. One result has been to recognize the central role that pragmatism has in science (science was always a thoroughly pragmatic enterprise but this had gone unrecognized for a number of reasons). Quine acknowledges the

¹ This is the way Hempel reacts to Quine's argument some 20 years later: "It is not clear just what claim is being made, in the context of a systematic exposition of a theory, by qualifying certain of its sentences as 'true by convention'....Such designation may serve to make a historical point about the way in which those sentences came first to be admitted into the theory--but that is of no significance for a systematic characterization of the theory. Nor, despite initial plausibility, can it be said that to qualify a sentence as true by rule or convention is to mark it as immune to revision in the eventuality that the theory should encounter adverse evidence. For, with the possible exception of the truths of logic and mathematics, no statement enjoys this kind of absolute immunity, as is illustrated by our preceding considerations, and has been made very clear especially by Quine's critique of the analytic-synthetic distinction....Theoretical concepts, just like the concept of living organism, are 'open-ended'; but that, evidently, is no bar to their being adequately understood for purposes of science. (pp. 161,163)

pragmatic character of science in the following quotations taken from the end of "Two Dogmas..."

My present suggestion is that it is nonsense, and the root of much nonsense, to speak of a linguistic component and a factual component in the truth of any individual statement. Taken collectively, science has its double dependence upon language and experience; but this duality is not significantly traceable into the statements of science taken one by one....The unit of empirical significance is the whole of science. (p. 42)

The totality of our so-called knowledge or beliefs, from the most casual matters of geography and history to the profoundest laws of atomic physics or even of pure mathematics and logic, is a man-made fabric which impinges on experience only along the edges. Or, to change figure, total science is like a field of force whose boundary conditions are experience. A conflict with experience at the periphery occasions readjustments in the interior of the field. Truth values have to be redistributed over some of our statements. Reevaluation of some statements entails reevaluation of others, because of their logical interconnections--the logical laws being in truth simply certain further statements of the system, certain further elements of the field. Having reevaluated one statement we must reevaluate some others....But the total field is so underdetermined by its boundary conditions, experience, that

there is much latitude of choice as to what statements to reevaluate in the light of any single contrary experience.

(p. 42)

Any statement can be held true come what may, if we make drastic enough adjustments elsewhere in the system....Conversely, by the same token, no statement is immune to revision. (p. 43)

The issue of there being [scientific] classes seems more a question of convenient conceptual scheme; the issue over there being centaurs, or brick houses on Elm Street, seems more a question of fact. But I have been urging that this difference is only one of degree, and that it turns upon our vaguely pragmatic inclination to adjust one strand of the fabric of science rather than another in accommodating some particular recalcitrant experience. Conservatism figures in such choices, and so does the quest for simplicity. (p. 46)

Each man is given a scientific heritage plus a continuing barrage of sensory stimulation; and the considerations which guide him in warping his scientific heritage to fit his continuing sensory promptings are, where rational, pragmatic. (p. 46)

In summary, implications of Quine's argument for science include:

- (1) Reducing the importance of formal logic and proofs in science;
- (2) Recognizing the importance of rhetoric in science, for example, how convincing and persuasive the presentation of a theory or research finding is depends less on appeals to logic, exact measurement, and

sophisticated analysis and more on how reasonable and rational it appears in a specific cultural and historical context; (3) The meaning of words cannot be fixed and non-existent identities between natural language terms cannot provide a foundation for science, there is no core structure or permanent foundation for scientific knowledge; (4)

Pragmatism is central to scientific research and theory.

Social studies education

If social scientific knowledge is the product of a pragmatic enterprise, can social studies education be otherwise? A major sub-text of social science, that is almost never articulated, revolves around questions such as these, as I have written elsewhere (Cherryholmes, 1988, chapter 6): What justifies our theoretical constructs and their measurement? What kinds of communities are we building and how are we building them?

In addition to reviving pragmatism in science along with its subsequent educational fall-out, Quine's argument points out that the "structure of the disciplines" or "core principals" that educators are fond of reviving and talking to each other about (there is little talk to those in the disciplines about disciplinary structure, for good reason) every 10 or 20 years are fictitious. (See Cherryholmes, 1988, chapter 7 for a detailed look at this.) This reveals an important sub-text, occasionally it has been the primary text, in social studies education: Social studies educators are pragmatically building communities but the sub-text has been so hidden and suppressed that it is almost never dealt with directly. (The global education movement is one exception to this.) Often social studies educators have claimed to

be doing something else: teaching critical thinking either by way of Dewey, Hullfish & Smith, and Hunt & Metcalf or by way of the jurisprudence of Oliver, Shaver, and Newmann; or teaching disciplinary knowledge from the social sciences and humanities by way of Mehlinger & Patrick.

Disciplinary knowledge is transitory and in the long run it turns out to be fictitious. This is not a pejorative use of fiction nor is it intended in a malevolent way because social scientists rarely claim they know the truth, they hardly utter the word. We are dealing in fictions because there is no foundational knowledge. This gives us the luxury of using a wider range of criteria in assessing the stories we tell students, thus the continuity between the social sciences and literature. The stories still can be ranked as being more or less truthful because the social sciences, for good reasons, have developed methodological guidelines for distinguishing better from worse stories. These guidelines do not provide a firm foundation for what we claim to know, however, because they are continually shifting and changing themselves. These methodological guidelines simply indicate how to tell social scientific stories given what we currently think are the best ways to tell such stories. The stories we tell can also be assessed in terms of aesthetics and ethics: Are the stories that social studies educators tell students beautiful or ugly? Are they ethical and moral or unethical and immoral? By giving up the illusion of foundational knowledge there is an opening for a richer, more complex, and, possibly more humane, approach to community building in education.

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